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A MANUAL OF THE INFUSORIA.<sup>1</sup>—The first installment of 144 pages of this work impresses us with the belief that the English reading student who desires to become acquainted with the remarkable animals of which it treats, should take early measures to secure a copy. The execution of the work, both as to illustrations and text, is excellent, while its size is convenient for actual students. The author introduces us to the objects of his studies in a highly agreeable manner, rendering even the details of the history of their successive discovery interesting. The scientific results are important, including some systematic views which will at least aid in the analysis of the forms included in the class. Thirteen divisions are recognized which fall into four orders, viz: the *Pantostomata*, *Discostomata*, *Eustomata* and *Polystomata*.

Mr. Kent devotes a chapter to spontaneous generation, and we make some extracts treating of this obscure and interesting subject.

"The general conclusions deducible from the long array of evidence now produced with respect to the question of 'spontaneous generation,' or 'abiogenesis,' may now be briefly summarized. From every line of inquiry investigated, one and the same answer is invariably returned. Life in its most humble and obscure form, be it existent as impalpable germinal dust floating in the atmosphere, or shaken from a truss of hay, or manifested in its more active state as the minute monads, bacteria and other organisms developed in infusions, tells everywhere the same unvarying tale. Traced backwards to its origin, or forwards to its ultimate development, each type is found by patient search to be derived, not *de novo* out of dead or inorganic elements, but from a specific parental form identical in all respects with itself, and whose life-cycle is as true and complete as that, even, of man himself. \* \* \*

"In order to arrive at a comprehensive insight into the life phenomena and progressive developmental manifestations of the special group of infusorial animalcules now under consideration, hay from different localities was placed in maceration and examined continuously, from its first contact with the fluid medium, for periods varying in duration from a few days only to several weeks. The water added to the hay was of the purest possible description, and was frequently boiled for some time to prevent the introduction of extraneous germs. In all instances the results obtained were broadly and fundamentally the same, and differed only with respect to the specific types found living together in the separate infusions. Even here, however, the general dominance of two or more special forms was notably apparent. Commencing with the first wetting and simultaneous examination of any given

<sup>1</sup> *A Manual of the Infusoria*; including a description of all known Flagellate, Ciliate and Tentaculiferous Protozoa. By W. SAVILLE KENT, F.L.S. Roy. 8vo. London, David Boyne, 1880.

sample, spores of different sizes were found congregated in countless numbers and in various orders of distribution throughout the surfaces of the vegetable tissues. The majority of these spores were excessively minute, spherical, of the average diameter of the 1-20,000th part of an English inch, and required necessarily the employment of the highest powers of the compound microscope for the correct registration of their characteristic form and size. Sometimes these spores were to be observed collected in definite spherical heaps, but more often they were scattered in irregular-shaped patches, such patches being often again more or less confluent, and thus forming collections of considerable extent. A large number of these spores were likewise to be seen, detached from their original adhesions, freely floating in the water or collected in masses upon the peripheries of the small air bubbles that had here and there become entangled between the slide and covering glass. In this latter instance the spores exhibited a thicker and more opaque bounding wall, and manifested, as in the case of lycopodium powder, the power of resisting for some time the hydrostatic or wetting action of the water: this property had already been suspected by Prof. Tyndall to be possessed by these minute bodies, but had not previously been practically demonstrated.

"The hay within from four to six hours after maceration revealed on examination of a small fragment, a considerable alteration in the character and comportment of the associated spores. Hitherto these had displayed no signs of motion, a uniform stillness reigning throughout the entire expanse of the microscopic field. Now, however, among the numbers that had become detached from their original adhesion to the vegetable matter, the majority exhibited an active vibratory motion that at first sight was scarcely to be distinguished from the characteristic 'Brownian movements.' The size of these motile spores corresponded with that of the quiescent ones, not exceeding the 1-20,000th of an inch in diameter, and without recourse to the highest magnifying power and the most careful adjustment of the illumination, it was not found possible to ascertain by what means their locomotion was accomplished. Examined successively with the  $\frac{1}{16}$ ,  $\frac{1}{32}$  and  $\frac{1}{60}$  inch objectives of Messrs. Powell and Lealand, it was at length satisfactorily determined that each individual spore or body was furnished with a single, long, slender, whip-like organ or flagellum, whose active vibrations propelled the spherical body through the water. These minute motile corpuscles exhibited, in fact, at this early stage of their development a type of organization in all ways comparable with that of the simply unflagellate genus *Monas*."

PACKARD'S ZOOLOGY, SECOND EDITION.<sup>1</sup>—In revising this text

<sup>1</sup> *Zoology for High Schools and Colleges*. By A. S. PACKARD, Jr. Second edition, revised. New York, Henry Holt & Co., 1880. 12mo, pp. 719. \$3.00.